REMARKS/ARGUMENTS

Claims 1, 3, 4, 9-12 and 36-38 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Starinshak et al. (U.S. Patent No. 5,100,517). Claims 5-8 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Starinkshak et al. in view of Andricacos et al. (U.S. Patent No. 5,352,350).

Claims 17-22, previously withdrawn, have now been canceled.

Claims 5-8 have also been rejected under 35 U.S.C. §112. The present amendment to claim 5 and new claim 39 satisfy the Examiner's requirements. See pages 10-12.

Claim 1

Starinkshak et al. teach a plating section including a single plating vessel and no plating liquid container (and consequently no second circulation mechanism) as the Examiner has admitted.

In the amended claim 1 of the present application, two flow paths for the plating liquid are recited, namely the circulation of the plating liquid between the plating vessel(s) and the plating liquid container, and the circulation of the plating liquid between the plating liquid container and the copper dissolution tank.

These two flow paths have different advantages and results. The circulation of the plating liquid between the plating vessel(s) and the plating liquid container serves to supply the plating liquid to the plating vessel(s). On the other hand, the circulation of the plating liquid between the plating liquid container and the copper dissolution tank serves to adjust the composition of the plating liquid.

Such arrangements including two circulating paths enable uniform plating to be achieved, even if a plurality of plating vessels are provided, as recited in claim 1. Therefore, the plating liquid container in the present invention can not be merely another storage reservoir. In the apparatus of Starinshak et al., the composition of the plating liquid does not tend to change significantly because of the single plating vessel in which less copper ions are consumed so that the plating liquid container is not needed.

Therefore, one of ordinary skill in the art would not be motivated by the apparatus of Starinshak et al. to arrive at the present invention recited in the amended claim 1. Allowance of claims 1, 3 and 4 is therefore requested.

Claims 5 and 39

Claim 5 has been amended herein to recite that the control section performs a control operation to replace the plating liquid in the copper dissolution tank with the replacement liquid so as to prevent the concentration of copper ions in the plating liquid from increasing. Unnecessary features are being deleted (see new claim 39).

Starinshak et al. and Andricacos et al. do not teach any use of a replacement liquid to prevent the concentration of copper ions in the plating liquid from increasing. A "new bath" is taught by Andricacos et al., which, however, cannot apparently prevent the concentration of copper ions in the plating liquid from increasing. Allowance of claims 5-8 and 39 is therefore requested.

As for claim 39, moreover, the plating liquid contacts with the copper supply source when the plating process is performed. After completion of the plating process, as a result of the replacement (discharging the plating liquid from the copper dissolution tank and introducing the

replacement liquid into the copper dissolution tank), the replacement liquid exists around the copper supply source so that the plating liquid (at least having the same concentration of copper ions as that of the plating liquid used in plating) does not contact the copper supply source, advantageously preventing deterioration thereof. Claim 39 ahould be allowed for this reason as well.

Claim 9 is being amended to include the features of original claim 12, which is being canceled. Claim 9 recites a weight measuring section for estimating the amount of copper supply source accommodated in the copper dissolution tank.

It is possible to provide the cartridges (which accommodate the copper supply source) with a sensor instead of with the weight measuring section as the means for estimating. However, if such sensor is provided in the cartridge, which is detachable from the plating apparatus, the structure of the cartridge becomes complicated and the cost of the cartridge increases accordingly.

On the other hand, it is possible to simplify the structure of the cartridge by using the weight measuring section for measuring the weight(s) of the copper dissolution tank(s) including the cartridge (which in turn permits eliminating the sensor). Thus, the combination of the weight measuring section and the cartridge is advantageous. The cartridge as defined above is not taught or suggested by Starinshak et al. and Andricacos et al. Therefore, allowance of claims 9-11 and 40 is requested.

New claim 40 recites that "the weight measuring section comprises a weight meter for receiving the copper dissolution tank and wherein the cartridge has one end closed by a bottom plate and another end provided with a pipe connection member." The arrangement of the

cartridge according to claim 40 facilitates using the weight meter for measuring weight of the copper dissolution tank. See page 79, lines 19-20; page 87, lines 5-12. Claim 40 may be allowed for this reason as well.

Each of claims 36-38 has been amended to recite that the copper supply source is accommodated in the copper dissolution tank so as to densely fill the space inside the copper dissolution tank.

In the apparatus of Starinshak et al., the copper nuggets 24 do not densely fill the space inside the replenished cell 20, so that the liquid can flow through the cell 20, avoiding the copper nuggets 24. Therefore, the copper ions are generated only from the portion of the copper nuggets 24 near the side wall of the replenished cell 20 and may not be sufficiently supplied to the liquid so that the composition of the liquid may not be properly adjusted.

On the other hand, in the copper dissolution tanks recited in the amended claims 36, 37 and 38, the plating liquid cannot flow so as to avoid the copper supply source, hence sufficient copper ions are more reliably supplied to the plating liquid in comparison with the apparatus of Starinshak et al.

Moreover, if the copper nuggets 24 were modified so as to densely fill the space inside the replenished cell 20 in the apparatus of Starinshak et al., the pressure loss of the plating liquid would be too high to stably supply the liquid to the plating cell 10. On the other hand, the pressure loss of the plating liquid can be reduced by the copper supply source having the features as defined in claims 36-38, although densely filling the space inside the copper dissolution tank.

In view of the foregoing amendments and remarks, allowance of claims 1, 3-11 and 36-40 is requested.

EXPRESS MAIL CERTIFICATE

I hereby certify that this correspondence is being deposited with the United States Postal Service as Express Mail to Addressee (mail label # EV 343 725 053 US) in an envelope addressed to: Mail Stop RCE, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on July 31, 2006

Cheryl Desvignes

Name of Person Mailing Correspondence

Cheryl DesVignes

Signature

July 31, 2006

Date of Signature

JAF:lf

Respectfully submitted,

James A. Finder
Registration No.: 30,173
OSTROLENK, FABER, GERB & SOFFEN, LLP
1180 Avenue of the Americas
New York, New York 10036-8403
Telephone: (212) 382-0700